Messari Proprietary Methods

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For a nascent industry like crypto to flourish, a transparent and detailed methodology for metrics and classifications is crucial. Below you will find the finer details with respect to the four most important metrics: price, volume, supply, and market capitalization. The Messari library is also composed of 100+ quantitative metrics and 15+ qualitative classifications available throughout our industry-leading data and research platform. To learn more about our quantitative metrics, head to our **Metrics** page. To learn more about our qualitative classifications, head to our **Classifications** page.

Supply & Marketcap

Overview

The supply characteristics of cryptoassets differ from all other asset classes. Issuance of new supply is determined by a mix of algorithmic issuance, asset creators' discretion, decentralized stakeholder voting, and other mechanisms. The variety of approaches taken across the top 20 assets, not to mention the thousands of other existing assets, is extreme.

As such, these assets require novel, but precise ways of defining and discussing supply. Given the lack of standards surrounding supply in the cryptoasset community, terms like "circulating supply", "available supply", or simply "supply" are frequently used interchangeably with different and imprecise meanings. This impacts a variety of metrics used to evaluate cryptoassets, including the important benchmark, "market capitalization", a term perhaps misappropriated from the equity capital markets. We

capitalization", a term perhaps misappropriated from the equity capital markets. We propose more precise supply tranches in an effort to create a single reference data standard that may be used across the industry.

Review of Supply Types & Terms

It's helpful to understand the ways cryptoasset supply can be generated or removed from circulation by both humans and algorithms. Some terms and their definitions:

- **Token Generation Event (TGE)**: Many assets are developed and released by a central organization or individual who may create some or all units before the network goes live. Units are typically allocated by the project managers to various stakeholders. In earlier years, this was known as "pre-mining", but has become standard issuance practice for many projects and more recently become known simply as "token generation". This supply is usually defined and allocated at the creation of the token.
- **Programmatic Issuance**: Supply that is issued according to a hard-coded schedule, without human intervention. This is usually accomplished through rewards issued by Proof-of-Work or Proof-of-Stake algorithms. Note that supply units can also be "burned" (eliminated) programmatically as well.
- **On-Chain Supply**: On-chain supply refers to units that are visible on-chain today, regardless of how many units will be released in the future. Blockchain analysis can be performed which confirms the existence of these units within the current blockchain.
- **Restricted Supply**: Units can be encumbered in various ways, meaning that it may not make sense to consider them accessible to the broader market, despite the fact that such units may be visible on-chain. This can include units that are locked by smart-contracts on-chain, or locked by traditional legal contracts such as vesting schedules.
- **Founders Supply**: Units can be allocated to founders or stored in organizational treasuries of a token seller or major ecosystem participant and sold (or acquired) over a long period of time. Founders supply can be split into liquid (unrestricted) and restricted supply.
- **Monetary Models:** Cryptoassets employ many different types of monetary models, including fixed supply, supply with perpetual but decaying inflation, constant

inflation rate, deflating, variable, and even unpredictable dynamics. It is precisely this variety of monetary models that necessitates a unique way of thinking about and defining supply for this asset class.

Time 0	**1) Token Generation**	a) Initial Generated Supply b) Max Supply
Time N	**2) Programmatic Inflation**	a) Defined Inflation Policy & Forecast b) Method for Amending Inflation Policy & Forecast Changes
	3) Programmatic Deflation	a) Loss Estimates b) Burn Policy
	4) Founders Supply (Company & Individuals)	a) Liquid b) Vesting / Escrow Policy c) Secondary Sale Policy
	5) Community Supply (Investors/Partners/Third Parties)	a) Liquid b) Vesting / Escrow Policy c) Secondary Sale Policy

Messari Supply Tranches

Investors typically need to understand how an asset's supply dynamics are likely to influence an investment. An investor's needs can vary dramatically according to their intended investment time-horizon, and the impact of a given asset's supply dynamics can vary widely. The supply tranches outlined below account for the varied nature of cryptoasset supply management, and distill asset supply into a framework that can be applied across the industry. Different aspects of this framework will be relevant to different investors, but it allows investors, creators, companies, and other stakeholders to all speak the same language regarding supply.

I. Tranche Outline

In order of largest tranche to smallest tranche:

Tranche #	Name	Definition
1	Maximum	The maximum unit-count that can ever exist (if defined).
2	Diluted (Y2050)	The unit count after most or all predictable dilution has occurred, within a reasonable investment time-horizon. We use 2050 inflation estimates for our dilution calculations.
3	Outstanding	Supply that is visible on-chain, including units which may be restricted.
4	Liquid	Supply that is visible on-chain, and which is not known to have any *programmatic* or contractual restrictions.
5	Circulating	Liquid supply that excludes project, foundation, or founder units which have not been yet been sold.

Additionally, we define two tranches with variable parameters:

Name	Definition
Active	The number of units that have moved on-chain over the past X years.
Liquid+N	The projected Liquid Supply N years from today.

II. Tranche Outline

- **Maximum Supply**: Since cryptoasset monetary models take many forms, the max supply can range anywhere from the same as at genesis, less, more, infinite, or even impossible to predict. This makes max supply an interesting figure, but more criteria are needed to build a useful sense of long-term supply from an investment perspective.
- **Diluted Supply**: Diluted supply is the figure most long-term investors will find informative. It defines how much Circulating (ie, fully unrestricted) supply is predicted to exist on-chain at a certain point in the future. Messari defaults to using the Y2050 figure today as a conservative benchmark. In the future, and as we aggregate clearer disclosures data from token creators, we may default to the Y+10

metric (the projected 10 year liquid supply). Comparing this figure across cryptoassets gives a good sense of relative supply dynamics, and the level of dilution an investor can expect from one asset vs another.

- **Outstanding Supply**: This is simply the supply units that are identifiable on-chain at a given point in time. For many assets, particularly those with a fixed supply at token generation, this will be the same as both Maximum Supply and Diluted Supply.
- **Liquid Supply**: We define an asset's liquid supply as the number of units that currently exist on-chain and which are not known to be encumbered by any contracts. Note that an encumbering contract could be both an on-chain smart-contract, or a traditional human-space legal contract. Thus, this figure takes into account both onchain-lockups, and founder/investor vesting and lockup periods. Until more of these contracts are discoverable on-chain, this will be a challenge to predict uniformly, one thing we are working to standardize with our Messari disclosures registry.
- **Circulating Supply**: The circulating supply acknowledges that tokens may be held by projects/foundations which have no intent to sell down their positions, but which have not locked up supply in a formal contract. Thus, circulating supply does not include known project treasury holdings (which can be significant). Note that an investor must carefully consider both liquid and circulating supplies when evaluating an asset, and the two can vary significantly. A risk of depending entirely on circulating supply is that the number can change dramatically based on discretionary sales from project treasuries.

III. Variable Timeframe Tranches:

- **Active Supply**: It's often helpful to understand how many coins are moving on-chain over a given timeframe. This is a key input in gaining a sense of holding/saving preference on a given chain, gauging real-world usage, and making educated guesses about lost-coins in order to modify other supply figures.
- **Liquid+N Supply**: Projecting fully liquid supply N years from now is one of the best ways to normalize cryptoasset supply dynamics in order to make sane comparisons between assets. As such, we propose using Y+10 - the projected liquid supply of an asset 10 years from now - as the standard meaning of "diluted supply". This satisfies the goal of accounting for significant dilution, while still being within a reasonable

long-term investor's time horizon.

IV. Examples:

	Bitcoin	Ripple	Civic
Maximum	20,999,998	100,000,000,000	1,000,000,000
Diluted (Y2050)	20,983,495	100,000,000,000	1,000,000,000
Liquid-10 (Y+10)	20,434,460	97,386,158,989	1,000,000,000
Outstanding	17,550,562	100,000,000,000	1,000,000,000
Liquid	17,550,562	21,821,174,210	778,000,000
Circulating	17,550,562	15,361,632,295	342,700,000

Note: Bitcoin Supply Curve, Ripple Supply Curve, Civic Supply Curve

Conclusion

Being able to see cryptoasset supply across these metrics will provide investors with one of the most basic and important fundamental valuation components. The ability to precise even talk about supply across assets, let alone calculate it, is sorely lacking in crypto today. At Messari, we're building as quickly as we can towards implementing this framework across our products. We currently use the Y2050 supply as our "~Fully Diluted" supply, and also provide Y+10 supply. Through our registry disclosures, we're building the necessary resolution to map out Circulating Supply and Fully Liquid Supply for many assets. A complete picture of cryptoasset supply and thus, cryptoasset marketcap is finally starting to emerge.

Volume

Overview

Crypto markets are highly fragmented. There are thousands of exchanges around the world. New exchanges come and go. As such, keeping track of the aggregate trading volume across all the exchanges is an extremely challenging task. Fortunately, exchanges

benefit from network effects. Thus, volumes tend to follow a power law distribution. In other words, the vast majority of the global trading volume is concentrated in a handful of exchanges.

Reported Volume

For a given asset, the "Reported Volume" metric refers to the aggregate volume across a list of most active exchanges. This list is comprised of:

1. Bibox
2. Binance
3. Binance.US
4. Bitfinex
5. Bitflyer
6. Bitforex
7. Bithumb
8. Bitmex
9. Bitso
10. Bitstamp
11. Bittrex
12. Bit-Z
13. Btc38
14. Btcbox
15. Btcc
16. Cexio
17. Coinbase Pro
18. Coinmate
19. CoinOne

20. Ethfinex
21. Exx
22. FTX
23. Gatecoin
24. Gemini
25. Hitbtc
26. Hotbit
27. Huobi
28. Itbit
29. Korbit
30. Kraken
31. Kucoin
32. Lbank
33. Localbitcoins
34. Luno
35. Okcoin
36. OKeX
37. Poloniex
38. Quoine
39. The Rock Trading
40. Sushiswap
41. Uniswap
42. Yobit
43. Zaif
44. Zb

Real Volume

It is well known that many exchanges conduct wash trading practices in order to inflate trading volume. They are incentivized to report inflated volumes in order to attract traders. "Real Volume" refers to the total volume on the exchanges that we believe with high level of confidence are free of wash trading activities. They tend to be regulated exchanges. They are a subset of the list of exchanges above. However, that does not necessarily mean that the volume reported by other exchanges is 100% wash trades. As such, the Real Volume underestimates the total global volume.

Currently, the "Real Volume" exchanges are:

1. Binance
2. Binance.US
3. Bitfinex
4. Bitflyer
5. Bitstamp
6. Bittrex
7. Coinbase Pro
8. Gemini
9. itBit
10. Kraken
11. Poloniex
12. Sushiswap
13. Uniswap

With the following included at 50% volume:

1. Bithumb
2. CoinOne
3. Huobi

4. OKeX
5. Upbit

Price

Overview

Since every cryptoasset can be traded on more than one exchange and as more than one pair (e.g., BTC/USD, BTC/USDT, BTC/EUR), we need a way to aggregate these different prices. The Messari aggregate price is a 24-hour volume-weighted average (VWAP) across various exchanges and pairs, quoted in USD.

Details of the VWAP algorithm

- For a given pair, the trading volume only counts towards the base asset but not the quote asset. The only exceptions are pairs that are denominated in a stablecoin such as BTCUSDT, where volume counts towards both the base asset (BTC) and the quote asset (USDT).
- If a pair is not quoted in USD, for instance in the case of BTC/USDT, we convert the price in USDT terms into USD terms, by using our USDT/USD rate. Then we use the converted price as an input for the VWAP calculation.
- Since some exchanges inflate their trading volume through wash trading, they can skew the VWAP significantly. As such, our VWAP use the "Real Volume" exchanges at inputs, as defined previously. Most top assets are traded on at least one of the "Real Volume" exchanges. For those that are not traded on any of the "Real Volume" exchanges, our VWAP includes the remaining exchanges.
- Some exchanges impose significant barriers on deposit and withdrawal of funds, such as fees and delays. This can lead to significant price premiums or discounts relative to other exchanges. These exchanges are excluded from the VWAP calculation.

Other derived metrics such as ROI are also based on this aggregate price.

Liquidity

Overview

Messari provides various metrics under a “Liquidity” umbrella, which are derived from bid and ask order book data across Real10 exchanges. These metrics can help users understand how much price might move in response to sell orders of various sizes, and therefore how reliable certain metrics that are computed from price might be, such as market cap. Since these metrics are using averages (see details below), they are not intended for day traders looking to execute transactions, but rather for analysts looking to better understand broad market structure. These metrics when looked at over time, should provide a good general picture of an asset’s market realities, and how they compare to that of other crypto assets.

Motivation

A common criticism of market capitalization as a dominant metric in crypto is that the inputs to the market cap equation - supply and price - can both be difficult to pin down in a meaningful and rigorous way. Messari has developed a detailed classification of supply tranches to address the supply side of the equation, and now various Liquidity metrics described here provide more insight on the price side. Specifically, we provide “liquidity adjusted market cap” figures that use prices accounting for slippage (amount price will move given a sell order of a certain size) in the market cap calculation, instead of just the last-trade data from exchanges. This may give a more realistic sense of how much market cap can actually be captured by asset owners for a given asset.

Details

These metrics are derived from raw order book data which is averaged over a period of time (usually 24hrs). We cover, roughly, the top 20 assets by market cap, by looking at the averaged depth data from the set of individual trading instruments that comprise at least 80% of an asset’s trade volume across Real10 exchanges. We look at the bid depth at various tranches between 0.1% and 10% of spot price, and how they average over time, and then compute various other metrics from that bid depth data. Specifically, we calculate “clearing prices to sell” (slippage) various dollar amounts into the market, and then use those resulting prices to calculate “liquidity adjusted market cap” at those tranches as well. As noted, this method is designed to provide a good sense of an asset’s

liquidity, and especially to be able to compare one asset's liquidity picture to another.

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